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ANNUAL ADDRESS,

BY THE HON. CHARLES P. DALY, LL.D., PRESIDENT,

DELIVERED JANUARY 25, 1870.

SUBJECT: *Review of the Events of the Year, and Recent Explorations and Theories for Reaching the North Pole.*

LADIES AND GENTLEMEN :

The year which has just closed will hereafter hold a prominent place for the important geographical and scientific events which have occurred within its limits.

1. The connecting of the North Atlantic with the Pacific Ocean by rail.

2. The completion of the canal across the Isthmus of Suez.

3. The explorations and discoveries in Southeastern and East Equatorial Africa.

4. The additional evidences brought to light of a climate in the ice-bound regions of the Arctic at a remote period of time, analogous to that of countries lying not very far from the equator.

5. The marvellous results of the deep-sea dredgings of Professors Thompson and Carpenter, revealing the existence of animal life at enormous depths in the ocean, where we should have supposed the existence of life to have been impossible.

6. The very general disturbance throughout this year, of the earth's surface by earthquakes ; distinguishable not so much for the effects in particular localities, as for the wide distribution of the phenomenon, and its appearance in parts of the world where such disturbances have not been witnessed within the memory of man.

7. The attractive power of mountains, ascertained by the pendulum experiments made at the observing stations upon the Himalayas in India.

8. The discovery, through the spectroscope, of a method of determining the proper motion of the stars, and the fact that the physical and chemical constitution of the whole stellar universe is identical.

9. The invention and practical use of a self-registering compass, by which every motion of a vessel can be recorded and preserved from the beginning to the end of her voyage.

10. The discovery of trees of enormous height and magnitude in Australia, one of which was found to be 69 feet in circumference.

11. Of great deposits of coal throughout New Zealand, and the finding of coal upon the borders of the Caspian Sea, verifying in the last particular, a prediction of Humboldt, 40 years ago. Both of which discoveries are of the highest importance to commerce.

12. The anthropological researches in Europe, Asia, and Africa, in relation to the structure, mode of life, and condition of primitive man.

13. The assembling, at Copenhagen, last August, of the International Congress of *Pre-Historic Archeology*, under the auspices of the King of Denmark, interesting in the circumstance that it brought into connection with each other learned men from all parts of Europe, and for the valuable information the papers and discussions elicited respecting three successive periods of man's progress, known as the Stone, the Bronze, and the Iron ages.

14. The return of Captain Hall from the Arctic, bringing back interesting mementoes of the Expedition of Sir John Franklin, and a more particular description of the geog-

raphy of the ice-bound region where the Captain had passed the last five years.

15. The exploration by Dr. Hayes of the remains of settlements made in the tenth century upon the south-eastern shore of Greenland, and the photographing of these long deserted habitations, and of the characteristic features of Arctic scenery by M. Bradford, the artist, with whom Dr. Hayes was associated ; being an interesting addition to the previous labors of Rink, the former Governor of Greenland and now the learned archeologist of Copenhagen.

16. The return of Captain Adams and his men from the exploration of the Colorado and its tributaries, which, apart from its geographical and geological importance, is said to have embraced an inspection of the ruins of cities, abandoned mines, canals, fortifications, bastions, etc., the remains of a former people upon this continent of whom we have no knowledge.

17. The French Expedition up to the river Mekong, and west-erly through the province of Hunan in China to the ancient capital of the province—one of the most remarkable journeys in the history of travels, a brief account only of which has so far been given by the surviving leader, Lieutenant Garnier.

18. The completion of the geological survey of New Jersey under Professor Cook, and the commencement of geological surveys of Ohio under Professor Newberry, of New Hampshire under Professor Hitchcock, and of Arizona and Colorado under Professor Hayden.

19. The Expedition of Sir Samuel Baker, last October, under the auspices, and with the aid, of the Egyptian Government, for the exploration of the Albert Nyanza, discovered by Baker in his memorable journey in 1864, and for establishing upon the lake steam navigation.

20. The successful passage of a Norwegian sloop, the *Solid*, from Hammerfest, in Norway, through the Carian Sea, the Straits of Waigatz, and along the Siberian coast to within a few miles of White Island, lying off the N. W. point of the Gulf of Obi ; interesting from the fact, that this small

vessel penetrated so far into waters hitherto regarded inaccessible, without encountering ice, or discovering any signs of it.

21. The Expedition of the Russian merchant, Sideroff, in his own steamer, the *Georg*, upon a voyage of exploration around the coast of Norway and through the Polar Ocean to the mouths of the Petschora, and from thence through the Straits of Waigatz, and, if possible, to the mouth of the Yenisei.

22. The Expedition of the Imperial Geographical Society of Russia, under the command of Baron Maydell, for the more complete exploration of that portion of Siberia situated in the extreme north-eastern part of Asia, near Behring Straits.

23. The return of one of the German Expeditions sent out for the discovery of the North Pole, and the sailing of another from Bremen last June, make up a hasty and imperfect catalogue of the events which distinguish the year, and denote the intellectual activity that has prevailed, and the important results which have attended it.

The completion of the Pacific Railroad has realized the dream of Jonathan Carver, the Connecticut captain, who, escaping from the bloody massacre at Fort William Henry, found his way to the waters of the Upper Mississippi, and during the three years that he dwelt among tribes previously unvisited, and while wandering over regions where the foot of a white man had never trodden before, conceived the project of establishing a settlement upon the shores of the North Pacific Ocean at some point between the 45th and 50th parallels of north latitude, and of connecting it by a road with the then infant colonies on the Atlantic, so as to bring them into direct connection with the wealth of China and the riches of India. It was, at the beginning of last year, exactly a century since he returned freighted with this idea, to find the colonies in an angry controversy with the mother country—the one exacting the recognition of their rights, and the other exacting obedience. Taking no part in the quarrel, he hastened to England to bring to her knowledge, as he said, the existence of countries which

would prove to her a more abundant source of wealth than any of her colonial possessions, and found that Government as insensible to the value of his suggestions, as they were *then* to any suggestion upon the proper management of their colonies. They took his maps and charts and kept them for five years until the war broke out, which, putting an end to his plans, he had to content himself with the publication of his travels—a work that has passed through many editions and is distinguished for the acuteness of his observation, the truthfulness of his narrative, and the comprehensive character of his mind. In that work he made the prediction, that the scheme which, he said, he had the honor of first planning and attempting, would one day be fulfilled; and the year which has just closed has witnessed its accomplishment, through an instrumentality, the rail and the locomotive, of which Carver had not the remotest conception.

The completion of the Suez Canal is the realization of another dream indulged in for 2,100 years; for there has floated down the stream of history a tradition that the project occurred to the mind of Alexander, and that he consulted his engineers, who reported against it from the difficulty of preventing the canal's filling up at its mouth, through the drifting of the sand; a difficulty still apprehended, now that it is cut and vessels have passed through it. The tradition may be true; for when Alexander achieved the bloodless conquest of Egypt, there was a canal from the Nile to the Gulf of Suez at the northern extremity of the Red Sea, eighty miles in length and forty feet deep—a work of itself sufficient to suggest to him the more important one across the Isthmus to connect the Red Sea with the Mediterranean. Herodotus says that the canal referred to was begun by Necos, an Egyptian king of the sixth century before Christ, and was finished by Darius, the Persian monarch. The difficulties of such an undertaking at that early period, and of the peril it involved, may be judged from a fact stated by Herodotus that 120,000 Egyptians, employed upon the work, lost their lives in making the excavation; a circumstance illustrating the truth of the observation of Gibbon, that the native indo-

lence of the Egyptian had to be quickened by the lash of the taskmaster. Herodotus tells us that Necos discontinued the work because the oracle had warned him that he was laboring only for the barbarian ; a term, says the historian, which the Egyptians applied to all who spoke a language different from their own. Sir Gardiner Wilkinson, the eminent Egyptologist goes farther back than Herodotus, and affirms, from the evidence of monuments, now remaining upon the banks of this canal, that it was begun in the reign of Rameses II., which would be a thousand years earlier, and he supposes that what Necos undertook, and afterward abandoned, was the reopening of the old canal, which is probably the truth, as a canal exposed through such a desert to the drifting sand would, if neglected, fill up. This, in fact, subsequently occurred. A century after the visit of Alexander, Ptolemy Philadelphus, in order to command the commerce of Arabia and India by means of this canal, which had filled up, caused it to be excavated, and founded at its eastern outlet the city of Arsinoë, at or very near the present site of Suez. Again this work fell into neglect, and remained buried in the drifting sand until the seventh century of our era. The memory of the Caliph Omar is perpetuated in the indignation of scholars for having ordered the destruction of the Alexandrian Library, with the treasures it is assumed to have contained of the learning, the arts, and the science of antiquity. Whether he was or was not the author of this act of vandalism—a point upon which historical critics have differed, there is one thing respecting him at least worthy of remembrance, which is, that he signalized his conquest of Egypt in the seventh century by devoting one-third of the tribute to the repair and restoration of her canals, and among them the canal of which we are speaking. He caused the sand to be removed ; and it was used for the purpose of navigation, it is said, for 134 years ; to be again filled up by the orders of another Caliph, to prevent supplies reaching his enemies, and was afterwards so forgotten, and completely lost, as to make it a matter of dispute whether it had ever existed. In the sixteenth century the

project of a canal from Pelusium, on the Mediterranean, to Suez, was conceived by one of the Turkish Sultans, who took possession of the Isthmus for the purpose; but the commencement of the work was arrested by his death. This great project was again revived by the first Napoleon, who ordered a survey to be made, when the remains of the long buried canal between the Nile and the Red Sea were discovered; but the perilous position in which the First Consul was soon afterwards placed, and the necessity of his departure from Egypt, put an end to whatever scheme he may have meditated. To all this should be added the popular error which prevailed from the time of Pliny, and probably before it, that the Mediterranean was thirteen feet higher than the Red Sea, and that there would be a strong current through the canal in one direction only. The year the events of which we are reviewing witnessed the completion of this long cherished project, and mainly through the energy of a single individual, M. Lesseps, who has hitherto overcome every difficulty—the raising of the vast sum expended upon the work, the secret or open hostility of governments whose interests were assumed to be opposed to it, and the cutting of it through a bed of sand, which, moving and flowing like the waves of the ocean, has buried cities and converted into deserts what were once populous districts. It must yet, it is true, be regarded as an experiment; but where so much has been accomplished and so many predictions of impossibilities have failed of fulfilment, it may be well for those who are so ready to hazard the opinion of its ultimate inutility, to wait until time and experience have settled the question. In this country, and especially in this Society, it has been watched with the deepest interest in every stage of its progress, and the fullest confidence has been felt in its final success. The apprehensions felt, especially by English writers, are from the effects which may be produced by the deposit of sand and mud, which is brought down in prodigious quantities by the Nile, and drifted eastward as far as Syria, so that places which lay along the shore when Strabo wrote, are now six miles inland. This, they urge, will penetrate

through the interstices of the stone piers that stretch out into the Mediterranean and constitute the entrance to the canal, and have their doubts whether these great forces of reaction may not prove too much for the power of man to overcome, or in overcoming them involve an expense too great for the profits of the work to bear. When it is remembered what has been already effected by the dredging machines in the excavation of the canal—machines in themselves a triumph of engineering skill in their wonderful adaptation to the extraordinary work they have accomplished, there is, I apprehend, little reason to fear that there will be any great difficulty, or any very heavy expense, in keeping the mouth of the canal permanently open. Then, again, our attention is drawn to the difficulty of ships, with heavy freights, navigating the Red Sea safely and profitably. The Red Sea is certainly one of the most perilous of waters, from the rocky islets scattered in all parts of it, and from coral banks, more numerous and extensive than in any body of water of equal extent in the world, lying close to the surface without any indication in the wave above of the peril beneath—perils poetically expressed by the Arabic name of the straits at the entrance of the sea, *Babel Mandeb, the gate of tears*. But, however formidable this may have been for ships depending solely upon the agency of the winds and currents, and for the primitive vessels manned by Arabs, which have hitherto chiefly traversed this sea, it does not present the like difficulty for steamers, and the time is not far distant when steam will be in as general use for the purpose of transportation upon the ocean, as it is now upon the land.

If this new gateway for commerce should prove successful, as I think it will, then it will have reduced the carriage by water between England and India from the 15,000 miles which it is now, to about one-half the distance, or 8,000 miles; and we may see a revolution in the transportation of the products of the world as great as that which was created at the close of the fifteenth century by the discovery of the passage by the way of the Cape of Good Hope. It will bring back the Mediterranean to its ancient position as the

great highway of the maritime commerce between Europe and Asia, and restore to the nations and cities upon its borders something of their ancient importance.

The explorations in South-eastern Africa have resulted in the discovery of gold fields, bearing evidence that they were worked at a former period, and the situation of which has led Sir Roderick Murchison, upon well-considered reasons, to the conclusion that this spot, the region of the Limpopo and its branches, was the long-lost *Ophir* of the Bible. Interesting as this may be, and important as the result may prove of a large immigration thither in pursuit of gold, it is of less value than the fact that there lies to the north of these gold fields, a fertile region of large extent, which is said to be the healthiest yet discovered in Africa, and to be well adapted for cultivation and settlement.

Among the other interesting facts of the year in relation to Africa, is the receipt of an official communication from Dr. Livingstone, under his own hand, putting at rest all questions as to his safety, and showing that he is actively engaged in exploring the country lying southward and westward of Lake Tanganyika, discovered by Burton and Speke, and that he has found, as he thinks, between the 10th and 12th degrees S. lat., the elevated land which constitutes the southern limit of the basin of the Nile, and that the springs and sources of that interesting river rise 400 miles south of Lake Ukerwerke, discovered by Speke; or in very nearly the same position laid down by Ptolemy 1650 years ago. It will be remembered that at our anniversary meeting, two years ago, I stated that, from an examination of the early maps in our own Collection, and from the investigations which I had otherwise made, I was convinced that the lakes visited by Speke and Baker were not discoveries. That they were known to mediæval cosmographers and geographers, and represented upon maps as early as the tenth and as late as the seventeenth century. That from a comparison of the maps and an examination of the accounts to be found in the works of old geographers, to which I then referred, I was inclined to believe that the sources of

the Nile would be ultimately traced farther south, and that Ptolemy and the Arabian geographers might turn out to be nearer the truth than had hitherto been imagined.

If Dr. Livingstone is right in his supposed discovery, then this river, the seat of the oldest civilization with which we are acquainted, will, in addition to its historical interest, prove to be the longest river in the world ; and whether he is destined to be the discoverer of the final sources of it or not, there are details enough in his letter to show that he will have contributed largely to our knowledge of the geography of this comparatively unknown part of Africa, and will hold the rank in all future time of one of the most successful if not the greatest of African explorers.

We have also the statement that an Italian, Carlo Piaggia, who has been wandering for some years in the regions west of the White Nile, has sent home the intelligence that there is another great lake lying west of the Albert Nyanza of Baker, which he could not reach, but the approximate position of which he was able to fix upon the unanimous testimony of the natives and Dr. Peterman of Gotha upon the information received, places this lake about 130 miles west of the Albert Nyanza of Baker,—a little to the south of the lake. I would add that upon some of the old maps a large lake is represented in about that locality as connected with the Nile, and also as the source of a great river running into the Atlantic, for instance in the Arabic maps of Magrebinus, 1274, and of Abulfedae, 1331 ; the *Mappa Mundi* of Mauro, 1459, and some others. I should also state that a telegraphic despatch, I have been informed, has appeared in the newspapers indicating that Dr. Livingstone, having failed to connect the streams and lakes he has been examining with the Nile, is now moving westward in the direction of the lake which this Italian traveller has heard of, which may possibly prove to be simply the western prolongation of the Albert Nyanza of Baker. To these new matters respecting Africa, may be added the discovery of the mouth of the Limpopo river by Mr. St. Vincent Erskine, of Natal, who has discovered the previously unknown lower course of this fine

river to its embouchure in the Indian Ocean ; and the Expedition of Captain Faulkner and his party up the Shire river and for the navigation of Lake Nyassa, which failed of success from the setting in of the rainy season.

The facts brought to light during the past year upon the subject of the antiquity of man are of an exceedingly interesting character. Among those of especial importance is the discovery in two small islands—Santorin and Therasia—in that part of the Grecian Archipelago known as the Cyclades, of the remains of villages or towns one hundred feet beneath an overlying strata of pumice stone and tufa, which, as in the case of Pompeii, had fallen suddenly upon them during the eruption of a volcano, and has so completely buried them for probably thousands of years, that vineyards, producing a wine much esteemed and exported to England, was growing luxuriantly upon the surface, beneath which lay the remains of this lost and long-forgotten people. The discovery was made in procuring blocks of tufa for use in the construction of the Suez Canal, and it is of the deepest interest, as all that has been discovered shows that these people lived during what geologists call the quaternary period of the tertiary, and anthropologists denominate the Stone Age, before the use of metals was known ; underlying all that we know of Grecian civilization ; before Homer sung, or any of those names which Grecian literature has made immortal had played their part in the world's history. As was the case in Pompeii, we are brought to the people as they were when this sudden calamity overwhelmed them ; the barley which they ate heaped up against the walls, the tools they used lying in their places, jars filled with pease and annise, cardamom, etc., and other kinds of pottery tastefully ornamented, troughs for the feeding of their animals, vessels for the pressing of oil, slabs of stone between which the corn was ground by hand, or as the archeologists call them, hand mills, stone disks with a hole in the centre, and a groove such as are still in use in the country by weavers for stretching the threads of the warp, flint arrow heads, lance heads, and flint saws ; but no trace of metals, not even a nail in the wood-work of the roof, and one

human skeleton only, that of a man, the sole representative of the inhabitants who dwelt there, which was found doubled up in a corner of a room as if he had been crushed by the falling of the roof. The details discovered show that this early people had made considerable advance in civilization; that they cultivated various kinds of grain, had domesticated animals, that they grew olives and pressed oil, that they imported products not of their own island by sea, and notwithstanding their imperfect tools of flint and stone, that they had skill as carpenters and masons, as they constructed houses in part of stone and of wood divided into chambers, and which must have been tolerably comfortable.

This is an interesting addition to the lake dwellings, the charred remains of which, it will be remembered, were first found some few years ago on the borders of the Swiss lakes, upon the receding of the waters in a season of great drought, and have since been discovered elsewhere in Prussia, Bavaria, Northern Italy, and the Danubian Principalities, some of them during the past year.

Flint implements, such as arrow heads, lance heads, and saws, and stone axes, and other tools and weapons of stone, belonging to an age and people before the use of metal was known, it will be remembered, have been found in all parts of Europe and in this country, especially within the past quarter of a century. They furnished the basis for the belief in the existence formerly, throughout the world, of a period known as the Stone Age. These discoveries, however, extending no farther than Europe and America, justified such a conclusion only in respect to the parts of the world where the evidence was found. There remained the older civilizations of Asia and North-eastern Africa, and unless some evidence was discovered in these early seats of civilized man, no general conclusion could be indulged in, that there was, originally, a Stone Age in every part of the world.

This evidence has now in part come to light. Egypt is the oldest civilization of which we have any knowledge, and it is interesting to communicate that during the past year, Mariette Bey, the French explorer, has, it is reported, found in

Egypt, underlying the civilization of the temples and the pyramids, flint and stone implements of the same general character as those which were previously found in Europe and America, belonging to a rude and primitive people, who dwelt in the land before these structures were erected ; and similar discoveries have been made in Asia Minor, especially in Palestine, and also in Central India and in Japan.

My limits will not permit me to go over in detail the mass of material accumulated within the year upon this interesting subject of the antiquity of man. I can only refer to the exploration of the hitherto unknown caverns lying around and below the Rock of Gibraltar, where vast deposits of human remains have been found in upper chambers, evidently used, in a long past age, as sepulchres, by a people of low stature and meagre muscular development, but by no means of a low intellectual type, and with them finely-polished axes and knives of stone, fish-hooks of bone and rude pottery ; together with the remains of sheep, oxen, birds and fishes ; and in the older chambers below, where no traces of man have been found, the remains of many animals now extinct, and of the elephant, the wild horse, the rhinoceros, the ibex, the African leopard, the badger, the fox, the rabbit and the rat ; with the evidence, in the shattered condition of the strata, to indicate that this rock was once joined to the African coast, and rent by a great subterranean movement, which opened the present straits or water channel, and changed the Mediterranean from a lake into a sea, at the very time, in all probability, when these animals, whose sepulchres are below, were living upon the rock or in its vicinity. The exploration, during the past year, of extensive caves in Sicily and in Portugal, filled with the remains of animals and men—cave dwellers—who, there is every reason to believe from the indications, were, like some of the present inhabitants of Africa, cannibals. But the details of discoveries of this nature are too many to enumerate, and I must stop here, with the general observation, that the evidence gathered during the year confirms what was previously supposed, that man certainly lived in the period known to geologists as the deluvium, and probably in the tertiary.

The deep-sea dredgings of the past year have told a tale that will revolutionize some of the conclusions of the geologist and disturb the order or arrangement of the naturalist. Animals, the remains of which the geologist has found in fossiliferous rocks, belonging to a species supposed to have been extinct for thousands of years, are now found living at great depths at the bottom of the sea, as actively engaged beneath the waters as their ancestors were, whose sepulchres are on the land, in the composition of rocks, which are to be their resting-place and the record of their life and labors, if these rocks should hereafter be lifted up and become a part of the land. It has been a settled conclusion of the geologist that the chalk and the sandstone were formed beneath the sea at different geological periods; but these dredgings show that in places at the bottom of the sea, not ten miles apart, both the chalk and the sandstone are now actually in the process of formation. This, with the facts that there are not, as has been supposed, zones of temperature beneath the ocean, and that at the enormous depth of three miles, where the cold is intense, where no light could be supposed to penetrate, and where the pressure is three tons to the square inch, animals are living, that have eyes, are among the contributions which the year 1869 has added to the stock of human knowledge.

There has been, since the year 1858, eight Polar expeditions fitted out either with the view of reaching the North Pole, or of collecting information respecting the geology, paleontology, physical geography, and natural history of the Polar basin.

In 1857, a Swedish expedition was fitted out at the expense of Captain Otto Torrell. It visited the western coast of Spitzbergen, reached to $80^{\circ} 40'$ in N. L., and brought home a valuable zoological and geological collection.

In 1861, another Swedish expedition was sent at the public expense, consisting of two vessels, which were put in charge of Captain Torrell, with a corps of scientific men. The north and west coasts of Spitzbergen were visited, and extensive journeys made in boats to perfect the maps and study the geology of these islands, and the expedition brought back a

vast collection of materials for studying their fauna, flora, and geology. It reached $80^{\circ} 30'$ N. L. by ship and $80^{\circ} 45'$ by a land journey.

In 1864, another Swedish expedition was sent with a scientific corps at the public expense, chiefly for the important geographical purpose of measuring an arc of the meridian. It visited the southern shores of Spitzbergen, completed the survey for the measurement, and, like the former, brought back a rich geological, zoological, and botanical collection. In this expedition the snow-covered peaks of Gillis Land, lying to the north and east of Spitzbergen, were distinctly seen, confirming the existence of this high northern land, which was first seen by Cornelius Gillis, a Dutch sea captain, in 1707, in about 80° N. lat., 30° E. long., but had never been observed afterwards until this Swedish expedition, and has not yet been reached.

The next expedition was that of the *Germania*, in 1868, sent out under the auspices and at the expense of the distinguished German geographer and cartographer, Dr. Peterman, of Gotha, for the discovery of the Pole, and which attained a high point then for a vessel, $81^{\circ} 5'$ in N. L.; the farthest ever reached being by Perry, in 1827, $82^{\circ} 40'$ N. L.; not, however, in a ship, but in a sledge-boat, over the ice.

The *Germania* first reached to $80^{\circ} 30'$ N. lat. and $6^{\circ} 35'$ W. long., where the ice was lying in heavy peaks. She then steered south down to $79^{\circ} 30'$ N. lat., where she was entangled in the ice, and sailed along the edge of the pack going back to $74^{\circ} 30'$ N. lat.; when an attempt was made to reach the coast of Greenland, but on attaining 14° W. long. they found an impenetrable barrier of ice-fields. A third attempt brought them to $17^{\circ} 30'$ W. long., $73^{\circ} 23'$ N. lat. They then directed their course to the N. E. coast of Spitzbergen to endeavor to force their way through Henlopen Straits and reach Gillis Land. In this effort they got farther to the east than the Swedish Expedition of 1864, when they saw to the east the ice extended in one vast unbroken mass to Gillis Land, which was plainly visible through the telescope from the deck of the *Germania*. They found around Cape Torrell immense

quantities of drift wood piled up upon the coast 20 feet high, denoting the activity of the current in this quarter. They waited until the 10th of September for the breaking up of the ice, but in vain, and upon getting clear of the land they went to the north $81^{\circ} 5' \text{ N. lat.}$, $16^{\circ} \text{ E. long.}$; when their further progress north was barred by packs of ice in every direction.

The next is the Swedish Expedition of 1868, under Captain Nordenskiöld and a large scientific corps. They directed their course to the coast of Spitzbergen. In August they anchored at Amsterdam Island, and from thence they attempted to penetrate along the $80^{\circ} \text{ N. lat.}$, but were met by impassable barriers of drift ice. They then turned their course north, and, after innumerable zigzags, attained to $81^{\circ} 16' \text{ N. lat.}$, but could make no further progress, the ice northward being impassable; and they found their way out in a south-easterly direction. They afterwards made an attempt to reach Gillis Land, but found it impossible, and again sailed northward from the Seven Islands, and after a number of zigzags through the drift ice they got in longitude $17^{\circ} 30' \text{ E. to } 81^{\circ} 42' \text{ N. lat.}$, supposed by them to be the highest northern latitude ever attained; in which, however, they were in error, for *Scoresby*, in 1806, reached in a whaler, in a favorable season, to $81^{\circ} 30' \text{ N. lat.}$ in $19^{\circ} \text{ E. long.}$, with an open sea still before him to the north, as far as the eye could reach; and in 1837, the *True Love*, of Hull, upon the report of Whitworth, her surgeon, reached to $82^{\circ} 30' \text{ N. lat.}$, $12^{\circ} 15' \text{ E. long.}$, and found the sea still open to the north-east, without any obstacle to prevent her further progress. At the point, $81^{\circ} 42'$, reached by this Swedish expedition, the ice lay in vast masses, and on their way they met with ice black with stones, gravel and earth, indicating the existence of land still further north; a fact to which several eminent English Arctic navigators attach great importance, as affording a hopeful indication of being able to reach the Pole, in this direction, by means of the land. This expedition not only made a vigorous attempt to get to the Pole, but surpassed many others in its geographical and scientific achievements. During their cruising

amid the drift ice, between 80° and 82° N. lat., they sounded continually with what is known as the "Bull Dog" apparatus, with most important results, not only in regard to the ocean's depth in this part of it, but also in respect to Arctic animal life at great depths. They found that Spitzbergen is not separated from Norway by a very deep channel; that it is only 300 fathoms, whilst it is more than 2,000 fathoms deep to the north and west of Spitzbergen. They obtained specimens of animal life at a depth of 2,600 fathoms, and brought back an immense collection of plants and petrifications.

The next is the German Expedition, in the *Albert*, last year, 1869. The *Albert* crossed Barentz Sea at 76° N. lat. from the southern shores of Spitzbergen to the northern coast of Nova Zembla, and reached the farthest point in her voyage, $80^{\circ} 14'$ N. lat., $90^{\circ} 52'$ E. long, where, in the month of June, the ice presented an impassable barrier, so as to prevent her proposed visit to Gillis Land. She then went to the western coast of Spitzbergen, where another attempt was made to reach Gillis Land, but without success. In this voyage a number of meteorological observations were made, the geography of several parts of the Arctic was corrected, and a collection of specimens was secured by dredging.

On the 22d of February, 1869, Captain Hagens sailed from Bremen in a screw steamer, the *Bienenkorp*, to Jan Meyens Island, for the purpose of seal hunting, and then to attempt to sail north as far as possible, in the months of June and July; but what has been the result, I have not learned.

The last is the Expedition of Mr. Lamont, of Glasgow, a member of the Royal Geographical Society, at his own expense, in his own vessel, the *Diana*; and though they reached Nova Zembla in May, and Spitzbergen in June, and the vessel was commanded by an experienced Norwegian navigator, they failed to get beyond the 80th parallel N. lat., the season being unfavorable; and there are now three expeditions there to hear from, and the French Expedition, which has been so long in preparation, of M. G. Lambert, which is to attempt to reach the Pole by the way of Behring Straits.

c *Former North Polar Expeditions.—Capt. Bent's Theory.*

This makes, as I compute it, about 113 expeditions, from the first under Sir Hugh Willoughby, in 1553, to the present year, which have been specifically sent out either to find a North-East or a North-West Passage, or to reach the Pole, or to rescue previous expeditions, or obtain scientific information, the details of which fill nearly 1,000 volumes.

Attempts have been made to reach the Pole by sailing north between Greenland and Spitzbergen, between Spitzbergen and Nova Zembla, by the way of Smith Sound, the route of Drs. Kane and Hayes, and through Behring Straits to the north, the north-east, and the north-west; but no vessel appears, upon any reliable information, to have got much further than the 82d parallel. There have been many theories as to the way to reach the Pole, and I will refer to one of the last, as it was first presented to this Society, and because the review of it will, to a great extent, bring under consideration the whole subject.

In 1868, Captain Bent, the flag officer of Perry's Expedition to Japan, and who was afterward engaged in hydrographic labors under Capt. Maury, at Washington, addressed me two letters as President of the Society, submitting for its consideration his theory for reaching the North Pole, by following the great currents that run northwardly in the Atlantic and in the Pacific, in which his views, founded upon hydrographical reasons, were set forth with great clearness, and, I may add, with great modesty. I placed the two letters in the hands of Dr. Hayes, the most competent member of the Society, to give an opinion upon the value of Capt. Bent's hypothesis. He was not much impressed by it; and in a paper which the Doctor shortly afterward read before the Society, he, in very courteous terms, referred to the theory of Capt. Bent, with the remark that the route suggested by him, and which the Captain supposes to be the course of the Gulf Stream through the Arctic, had hitherto proved to be one of the most impracticable. He thought more favorably of Capt. Bent's suggestion of following the course of the current N. E. through Behring Straits, but expressed his own preference for the route through Smith

Sound, which Dr. Kane and himself had followed, with the important result of finding open water. Capt. Bent afterwards, in a lecture at St. Louis, reviewed the objections of Dr. Hayes at some length, with the observation that the Doctor had "failed to see the point and gist of the theory," being "wedded to his own dogmas"—I use Capt. Bent's language—"in face of the thousands of lives, the millions of money, and the three hundred years of time that have been wasted in attempts to reach the Pole," in neglect or ignorance of the way, which Capt. Bent thinks he has discovered, of finding it. I afterwards examined the theory myself, and, coming to the conclusion that experience of the past was not favorable to it, I, as Capt. Bent had requested, read his two communications to the Society at one of its meetings last year, without giving any expression to my own opinion, and where the theory was received with some observations on the part of the members which could not be considered as either favorable or unfavorable. As it failed to impress those in the Society who had especially examined it, and as public attention has since been earnestly called to it, not only by Capt. Bent himself, but in a popular magazine in this city with the statement—I quote the language—"that there is reason to believe that the perilous question of the way to the Pole has at last been answered; that a great mind has successfully *bridged* the polar *chasm*, and furnished a true *chart* and a true *compass* with which to reach the Pole in safety." I propose, in behalf of the Society, and in the general interest of geographical science in this country, to examine calmly what foundation there is for so confident an assumption.

I do not propose to examine the deductions which Capt. Bent has drawn from what is known respecting the laws of oceanic currents, for several reasons: 1. Because our knowledge of these laws is as yet imperfect. 2. Because the deductions drawn by him are in their nature speculative, or, as he says, "purely hypothetical," and the precise weight or value to be attached to them in their bearing upon such an inquiry should be left to those who have made hydrographi-

cal studies a specialty ; and *lastly*, because, in the absence of a series of thermometric observations of the sea surface, I attach very little value to any such broad and general conclusions, however plausible or attractive they may appear ; being of the opinion of that experienced Arctic navigator and writer, Captain Sherard Osborne, that what is wanted now upon the subject of Polar exploration are, facts and not theories. We have had a striking illustration during the past year of the little value to be attached to theories, or rather of the effect of relying upon them. About a century ago, Forbes, the naturalist, as the result of his observations, came to the conclusion that there was a succession of natural zones of marine life in the ocean, which became more sterile in organism as we went down, until a zone was reached, at or about the depth of 300 fathoms, containing little or no trace of animal life. It is due to this distinguished naturalist to say that he presented it simply as a suggestion, and urged the necessity of dredging farther down into the depths of the ocean ; but he died, and, without any further investigation, his theory was eagerly grasped at and accepted by men of science, because it afforded a simple and rational explanation of various phenomena which had long remained enigmas to paleontologists and geologists, and it maintained its ground to a certain extent until last year, when the facts brought to light, in the dredgings to which I have referred, showed it to be entirely unfounded. To which may be added the theory of a north-west passage for vessels to Asia, which, reasoning from geographical analogy, appeared so exceedingly probable that it was long universally believed in. I propose therefore to examine Captain Bent's theory by the test of the facts which have been supplied by past experience.

I may remark in the outset, that this theory necessarily assumes as a fact, the existence of an open polar sea, and that the theory is relied upon in support of the existence of such a sea, and as explanatory of the cause of it. This is a very old belief. It has been believed in for more than two centuries. It is supposed to have been first suggested by Hendrik

Hudson;* but the form and shape even, of this supposed sea is to be found engraven in *Matthew Quad's Fasciculus*, published at Cologne in 1608—a work to be found upon the shelves of our Library, where it is gravely represented with four rivers running from it, to the north, the east, the west, and the south, and yet its existence is as uncertain now as it was when this engraving was printed. The only evidence in support of it is the fact that open water of considerable extent has been seen by Hedenstroem and Wrangell, north-east of Behring Straits; by Morton, of Kane's Expedition, and afterwards by Dr. Hayes, in Kennedy's Channel, and by Capt. Penny in Wellington Channel; but it by no means follows from this that what was seen was a sea, or the affluent of one. The most experienced Arctic navigators are divided in opinion upon the question. Capt. Hamilton, during the last year, read a paper before the Royal Geographical Society, to show that the facts which Capt. Maury adduced in support of the existence of such a sea, are, as facts, totally without foundation; in which, I think, all will agree who have read Capt. Hamilton's modest and very able paper. In the discussion which followed the reading of it, Sir Edward Belcher adhered to his former opinion that such a sea existed, of which opinion also was Capt. Inglefield; whilst Sir Leopold McClintock and Capt. Sherard Osborne, certainly two very competent critics, differed from Sir Edward and agreed with Capt. Hamilton, that the theory of an open polar sea had broken down. Capt. McClintock said that those open water spaces could be readily accounted for by strong currents and tides. That they were solely due to the action of the tides sweeping away the ice as fast as it was formed, and were common all along the coast of Greenland, and were known to the Esquimaux, and that nothing that had been seen of late years warranted the belief of the existence of a warmer climate to the north. So that this question must be regarded as too unsettled and uncertain to be accepted as a fact in connection with the theory of Capt. Bent.

* *Henry Hudson in Holland*, p. 27, note by Hon. Henry C. Murphy. *The Hague*, 1859.

Capt. Bent's theory is this : That the Gulf Stream of the Atlantic, and the warm Japanese current of the Pacific, are each prolonged to the vicinity of the Pole ; where he thinks these currents unite, and, discharging their heat, produce an open polar sea. He is of the opinion that these currents are the prime and only cause of the existence of this sea, and that they constitute the only practicable avenues by which ships can reach it or the Pole ; or, to use his own language, the way to the Pole is by following the course of these currents, which are water thermometers, and may be termed the *thermometric gateways to the Pole*.

In consonance with this theory, he assumes that the northerly branch of the Gulf Stream extends around the coast of Norway, and runs from thence eastward of Spitzbergen, to the Pole, and that the Japanese current, or *Kuro-Siwo*, is prolonged through Behring Straits, in a north-eastwardly direction, until it encounters and mixes with the other in the vicinity of the Pole. There is a powerful current running in a north-easterly direction through Behring Straits, known on the maps as the Kamtschatka current, which he concludes is a prolongation of that upon the coast of Japan, and in which he may possibly be right.

Mr. T. B. Maury, the writer of an elaborate article in "Putnam's Magazine," in support of this theory, goes farther, and, in the rough map which is printed with the article, lays down the northerly branch of the Gulf Stream as running along the coast of Norway, eastwardly, to Nova Zembla, and as deflected from there in a northerly direction, and eastward of Spitzbergen, to the Pole. As authority for this he relies upon a passage in the work of our former associate, the late Dr. Kane, who says : "The Gulf Stream, already traced to Nova Zembla is deflected by that *peninsula*, into the space around the Pole." Dr. Kane does not state by whom, or where, this stream was traced to Nova Zembla ; and how little the Doctor did or could know of the direction of currents in that quarter of the Arctic, is apparent at once from this very extract, in which he supposes Nova Zembla to be a *peninsula*.

The fact is, that we have no positive information as to the course of the Gulf Stream beyond the coast of Norway. In the best and most recent atlases, such as Johnston's Physical Atlas, last edition; the Royal Atlas, of 1860, by the same author; the Atlas of the Geographical Institute of Weimar, 1868, and Kiepert's (Stieler's) Atlas, which has just been completed in Gotha, there is no agreement respecting it. In the first named of these works, Johnston's Physical Atlas, its course is represented differently upon different maps.*

The fact that drift wood was found, together with vegetable productions of the West Indies, upon the N. W. shore of Spitzbergen, as high as 80° N. L., by the Swedish expeditions of 1861 and 1868, indicates that it reaches that far, but, as the officers of the last expedition in their report say, "in a greatly weakened state," and the circumstance that bottles, thrown overboard in the West Indies, have been found upon the coast of Norway, together with the fact that there is a slow current along that coast as far as the fiord or bay of Varanger, which keeps the navigation open for that distance throughout the year, would indicate also that an easterly branch of it runs along that coast; but if it were continued from there to Cape Kanin, and from thence to Nova Zembla, and northerly, as it is represented in Kiepert's Atlas of 1869, we would naturally expect to see its effects in ameliorating the climate of that inhospitable shore, and that Nova Zembla would not be, as it is, so bleak and desolate as to be incapable of maintaining even a permanent savage population.

As the movement of the Gulf Stream is due to the diurnal motion of the globe, it necessarily diminishes gradually both

* In the text, page 46, it is said to flow in a north-easterly direction, passing Norway and Spitzbergen, to its outlet in the Arctic Sea, and in the map of the Ocean Currents, page 47, it is pictured as flowing to the southern extremity of Spitzbergen; while in the map of the Polar Basin, upon the contrary, it is represented as running to and along the north-eastern course of Nova Zembla, and from thence following in a circuitous course around the Polar Basin and the northern part of Russia, to a point about opposite Behring Straits.

in volume and velocity as it runs northward. The contrast is very great between the same current off the coast of Florida and when it approaches Newfoundland. In passing to the high latitudes of the Arctic seas it is so reduced and weakened, that Admiral Irminger, of the Danish navy, in 1853, between 61° and 63° north latitude, and $14^{\circ} 18'$ west longitude, found that it ran during an observation of twenty days, only at the rate of 3.1 nautical miles per day, whilst at the end of the Gulf of Florida, in the parallel of Cape Canaveral, according to Johnston's Physical Atlas, it is said to run sometimes at the rate of five miles an hour, or 120 miles a day; which is, perhaps, an exaggerated statement.

With the view of ascertaining what we really know respecting the velocity and course of the Gulf Stream, I applied to one of the oldest members of the Society, G. W. Blunt, Esq., whom, as the head of the well-known house that has for nearly a century prepared and published the charts that have guided the American mariner in every quarter of the globe, I considered the most competent person with whom I was acquainted, to furnish the information. I submit his reply.*

* G. W. BLUNT'S LETTER.

NEW YORK, December 22, 1869.

Chief-Justice DALY.

MY DEAR SIR,—I send you my *North Atlantic Memoir*, which contains all the accurate information (I am sorry to say, not a great deal) about that much misrepresented current of the ocean, the Gulf Stream, which body has to bear with the inventions of Maury, the stupidities of weather predictors, and the assumptions of meteorologists—enough, either of them, to crush out the vitality of any thing which had not so perfect an organization as the Gulf Stream has.

The only accurate observations we have of the Gulf Stream are those of the U. S. Coast Survey, directed by Professor A. D. Bache. He shows that the velocity of the stream was, off Cape Canaveral, about three nautical miles; Cape Fear, about two nautical miles, and off Sandy Hook (New York), one nautical mile; that is, the stream was divided into three sections, named as above. These sections comprise a space from lat. 28° to lat. 40° , from long. 80° to long. 66° , being 720 miles of latitude, and 840 miles in extent. *In that distance the stream diminished its velocity two-thirds.*

The only observations I know of to be relied upon beyond the above quoted, is this. In June, 1853, two ships came in contact, and both went down. The

With its velocity so diminished and weakened as it is found to be by observation in the Arctic, is it reasonable to suppose that it has still sufficient force to carry it to the Pole? and should it extend so far, how small must be its influence upon the temperature and climate of the Polar basin, embracing as it does a million and a half of square miles.

It may be further remarked that if this warm ocean river

foremast of one, the *Trade Wind*, was fallen in with, and there was a man on it, who was taken off. The mast had drifted 72 miles on a course E. N. E. nearly (true) in 101 hours, making nearly $\frac{72}{101}$ of a knot per hour. He was picked up in lat. 42° N., long. $55^{\circ} 30'$ W., thus showing a steady diminution of the velocity of the Gulf Stream current.

To the eastward of the above longitude nothing is known. At the Western Islands, lat. 39° , long. 28° , the set is easterly about 10 miles per day. This is, I think, due to the prevalence of the westerly winds.

In the article on "Ice," page 15, you will see that an iceberg was seen in lat. $30^{\circ} 10'$ N., long. 39° W., showing it had been set there by the Polar and Gulf Stream currents; but the rate of its set is not known.

Beyond the Western Islands, I believe that the Gulf Stream has no existence, and that the alleged effects of it on the climate of the British Islands are due to the assertions of the class I have spoken of in the first paragraph of my letter.

The temperature of the stream you will find I have written about in the "Memoir" which accompanies this letter. You will, I think, find this Memoir interesting, if not fanciful, too frequently the case with writers on hydrography.

The Gulf Stream as a current, I believe, entirely ceases and loses all its equatorial heat to the eastward of the longitude of 40° ; the set to the east is that of the general set of the N. Atlantic, and the temperature of the water is that of the general temperature in those regions.

Of the effect of the temperature of the Gulf Stream at any distance from it, I think it but small, as the mass of atmosphere of the Gulf Stream bears a very small proportion to the atmosphere around it, which would soon equalize its temperature.

There are, in my opinion, two very erroneous ideas of the Gulf Stream, of which I will speak. The first is as to the effect of the Gulf Stream on the climate of Newport; that it softens it. The nearest point of the Gulf Stream to Newport is 155 miles, the prevalent winds are westerly, and how temperature is, in sailor phrase, beat to windward that distance, I do not know. It is 45 miles nearer Nantucket, and only 35 miles farther from Boston, where an easterly wind of a summer's day gives you the shivers.

The Sargasso Sea is the other erroneous idea to which I refer. I have a chart before me, where it is laid down very like the marshes where I used to shoot snipe upon. This does not exist. I give the language of Lieutenant Walsh,

pursues its way through the regions of the Arctic, maintaining an open passage between Spitzbergen and Nova Zembla to the Pole, it is very extraordinary that none of the vessels that for the last three hundred years have tried to sail northward and eastward in this direction have ever been able to meet with it, but have always been compelled to put back before impassable ice. [Is it to be supposed that the many able and experienced seamen who have been thus baffled in this very

U. S. N., page 31 Atlantic Memoir, who was sent by the Navy Department to examine the dangers of the North Atlantic.

We saw very little Gulf or sea weed in it, but much on its outer edge. While mentioning this weed I may here remark, that we looked in vain in the region assigned to the Sargasso Sea for the great fields of it which had been reported. Small patches of five or six feet, generally arranged in long parallel lines in the direction of the wind, were seen daily in crossing the Atlantic till we reached the longitude of 28°, when it disappeared altogether.

My frequent examinations of this weed satisfy me that, wherever it may originally come from, it feeds and grows upon the waters of the sea, which is certainly not more strange than the plant which feeds upon the air.

This weed grows upon the Andros Islands, which are on the eastern edge of the Bahama Bank.

Washington Irving, in his life of Columbus, says :

“On the following day there was either a profound calm or light winds from the south-west. The sea, as far as the eye could reach was covered with weeds ; a phenomenon often observed in this part of the ocean, which has sometimes the appearance of a vast inundated meadow. This has been attributed to immense quantities of submarine plants, which grow at the bottom of the sea until ripe, when they are detached by the motion of the waves and currents and rise to the surface.*

“These fields of weeds were first regarded with great satisfaction; but at length they became, in many places, so dense and matted as in some degree to impede the sailing of the ships, which must have been under very little headway. The crews now called to mind some tale about the frozen ocean, where ships were said to be sometimes fixed immovable.

“They endeavored, therefore, to avoid as much as possible these floating masses lest some disaster of the kind might happen to themselves.”

In the journal of Columbus, prepared by the Spanish hydrographer, Navarette, there is no account of any large quantity of weed seen by Columbus — which he would certainly have entered had he seen it, as he mentions to us very trivial matters in the journal.

In the “Nautical Magazine” of 1859, there is an article on the Temperature of the Sea around the Coast of Scotland, by James Stark, M. D., which dis-

* Humboldt, Personal Narrative, Book I., Chap. 1.

region, would have been insensible to the value and importance of a current running steadily to the north, or north-east, if such an one was to be seen, or fail to notice the surface indications of it, or its influence upon the calculations of their reckoning?

The German Expedition of 1869, as I have already stated, found piles of drift wood twenty feet high upon the S. E. shore of Spitzbergen. Capt. Torrell in 1861 picked up a well-known bean at Shoal Point, that had found its way from the Gulf of Mexico, and the Swedish explorers of 1868 say, "during our cruising amid the ice, we collected a number of pieces of drift wood and glass balls, of the kind used as floats, in the Loffsdén fisheries;" showing that these Arctic seas are not without these surface indications which serve as a guide to the mariner of the course of currents. It was in this very region, between Spitzbergen and Nova Zembla, that Sir Hugh Willoughby attempted to reach India in

cusses the whole subject of North Atlantic temperatures and currents. I think it refutes Captain Bent's theory entirely.

Yours truly,

GEORGE W. BLUNT.*

* Having been informed, since the delivery of the address, that the exact velocity of the Gulf Stream, as it passes around the coast of Florida, has been recently accurately ascertained by the United States Coast Survey, I addressed a note to Professor Peirce, and received the following reply:

LETTER OF PROFESSOR PEIRCE, SUPERINTENDENT OF THE U. S. COAST SURVEY.

"U. S. COAST SURVEY OFFICE,

"WASHINGTON, 15th February, 1870.

"HON. CHAS. P. DALY,

"President Am. Geog'l Society.

"DEAR SIR,—I have the pleasure of furnishing you herewith a Table of the observed velocities of the Gulf Stream at three stations in the Straits of Florida, the vessel having been anchored in order to make the observations.

"Yours very truly,

"BENJAMIN PEIRCE,

"Sup't U. S. Coast Survey."

TABLE.

Currents of the Gulf Stream observed in Florida Strait.

Station No. 1.—Lat. 24° 16'	}	current 2.3 miles per hour.
Long. 82° 22'		
Station No. 2.—Lat. 24° 37'	}	current 2.0 miles per hour.
Long. 80° 28'		
Station No. 3.—Lat. 25° 05'	}	current 1.7 miles per hour.
Long. 79° 57'		

this direction, sailing from North Cape two hundred miles north-east and by north, when, discovering no symptoms of land, he took a direction south-east, and again turned to the north, and continued shifting and turning, in doubt and uncertainty, until he saw what is supposed to have been that part of Nova Zembla, known as Goose Cape; an expedition that had a dramatic close, as the event is touchingly told in the simple narrative of Hakluyt: "The vessels were separated at night in a tempest; one found her way into the White Sea by a route then unknown to Western Europe, and ultimately reached England; the other two, commanded by Sir Hugh, were discovered the following year by some Russian fishermen in the mouth of the river Varsina, in Nokinjiff Bay, on the coast of Lapland, with every soul on board of them, sixty-five persons, frozen to death; the journal in which the last incidents were recorded being found in the cabin. The two vessels were carried into Cholmaghoru, at the mouth of the Dwina, where the English residents of Moscow caused the dead bodies to be confined and put on board the larger vessel, which, manned with a Russian master and crew, sailed for England, and was never afterwards heard of."

Barentz, the Dutch discoverer of Spitzbergen, in 1594 could get no further than the northern extremity of Nova Zembla. In his second voyage, in 1595, he sailed north, until he reached 80° N. L., discovering Spitzbergen; but finding his further progress in this direction impeded by ice, he retraced his route and endeavored to find his way along the eastern coast of Spitzbergen, and then struck out to the eastward until he reached Nova Zembla, when he turned again northwardly, but had to put back before large masses of drifting ice, which carried him around the northern extremity of Nova Zembla, until he was finally encompassed and frozen in for the winter in a bay at the N. E. of this desolate land, where his crew endured an amount of human suffering almost without a parallel, even in the history of Arctic discovery.

If the warm current of the Gulf Stream were running to the N. E., as Capt. Bent and Mr. Maury suppose, Barentz must

have crossed it and failed to notice it, anxious as he was to get to the northward; for his instructions were to avoid the coast of Nova Zembla and to push directly through the Northern Ocean, or, in other words, to go N. E. in the very direction where the Gulf Stream is supposed by Capt. Bent to run. In 1607 Hendrik Hudson attempted in this sea to put to the north and east until he was entangled in ice, and compelled to put back to Nova Zembla, where, even though it was the month of June, this most daring of navigators abandoned as fruitless any further attempt to get to the north or north-east in this direction.

It would involve too much detail to recount, over the period of two centuries and a half, the various attempts that have been made unsuccessfully to cross the Polar basin by sailing to the N. or N. E. in this quarter of the Arctic.*

*Burroughs in 1570 reached the Waigatz, and Nova Zembla, but abandoned the hope of getting any farther. In 1583, Pet and Jackman approached Nova Zembla, but were enclosed in ice and had to return. In 1610, Poole pushed to 77° 25' west of Spitzbergen in the attempt to reach the Pole, but had to put back; and upon his third voyage he narrates that Thomas Marmaduke had penetrated to the latitude of 82° north of Spitzbergen. In 1614, Fotherby went out in pursuit of a north passage. He reached to the latitude of 80°, when he found a great barrier of ice, in which he was embayed, and extricated himself with difficulty. Fotherby again went out in 1615 and reached the northern point of Spitzbergen, where he tried to find a passage to the Pole, but had to give it up and returned to England. From this time until 1773 all further endeavors to reach the Pole were abandoned; but that year Captain Phipps, afterwards Lord Mulgrave, was sent out by the English Admiralty to make the attempt. He came within view of the remote northern part of Spitzbergen, which the Dutch call North-East Land, 8° N. lat., 20 long. E., and attempted, but in vain, to get further to the eastward. From the 80th parallel he saw but one unbroken surface of ice. In 1817, Scoresby was stopped in the same vicinity as Phipps had been, in the attempt to get eastward. In 1818 Buchan had a like experience in the attempt to push northward to the Pole north of Spitzbergen, reaching only to 80° 32' N. lat., and came near losing his ship, which was for some time immovably fixed in the ice. In 1823 Clavering, having reached Cloven Cliff in the north part of Spitzbergen, endeavored to go northward, but could get no farther than 80° 20' N. lat. In 1827 Parry worked his way northward and eastward with his ship to Walden Island north of Spitzbergen, when he had to put back to Hecla Cove, from which he made his unsuccessful attempt to reach the Pole by a land journey. All these attempts were made to the west or north of Spitzbergen. To the east-

I will simply call attention to the fact that throughout the seventeenth century and for a considerable portion of the eighteenth, the Dutch were actively engaged in prosecuting a lucrative whale and seal fishery in the seas east and north of Spitzbergen. They constantly visited the island at its northern extremity, and the German Expedition of last year, in the *Albert*, found the ruins of their boiling establishment and numerous gravestones with their pious Dutch inscriptions still remaining. This industry, according to De Witt, in 1676 maintained 12,000 persons. In some years as many as 130 Dutch vessels were engaged in it. They have preserved in Holland a record of the voyages made by these Dutch fishermen from 1661 to 1756, and they amount to the large number of 17,461. In pursuit of whales and seals, the latter being very abundant, they penetrated to the north and eastward beyond Nova Zembla and westward towards Greenland, wherever open water was to be found, with all the hardihood and daring for which Dutch sailors at that period were distinguished, availing themselves of the earliest openings of the season and continuing to its very latest period. In short, they ransacked every portion of these seas, until, in the words of a Dutch historian, they fished them out; to which must be added the voyages of English, Scotch, Spanish, and American fishermen, who were actively engaged in these seas at the same period and afterwards. It is not unreasonable to suppose, that if this warm oceanic river were running through these seas with a volume and intensity sufficient to carry it, as Captain Bent imagines, to the Pole, these hardy, experienced, and adventurous mariners would have failed to find it out, and by means of it their way into the open sea, which, according to this theory, it serves to keep up in the vicinity of the Pole. The merchants of Amsterdam especially, and the States General, were then keenly alive to

ward, between it and the northern extremity of Nova Zembla, the Arctic Ocean is very deep, and as the ice here moves in large masses to the southward, it may be that a vessel in this direction might get farther to the north than in any other part of the Arctic, but the undertaking is one of great difficulty and danger.

the importance of finding a passage across the Pole, or in that direction, eastwardly to the East Indies, as it would materially lessen the distance to India and give Holland, from her closer proximity to the north, a commanding advantage over the other maritime nations of Europe. Both the Amsterdam merchants and the Dutch Government had sent out several expeditions, and when they failed to accomplish this desirable object the States General offered a reward of ten thousand dollars to any private persons who might make the discovery of a north-east passage. Even if this incentive had not existed, would not these fishermen, intent upon the pursuit of whales and seals, when their number began to diminish, have naturally gone to search for them in this open Polar sea, as it was believed in then as well as now, if they could have found their way into it?

But Capt. Bent believes that they did, and Mr. Maury, in his article, refers confidently to what he calls "the positive facts" adduced by Capt. Bent from the archives of the Royal Society of London, that, in 1655, a Dutch whaler sailed in a perfectly free and open sea to within one degree of the Pole, and that about the same period another went two degrees beyond it, by following, says Capt. Bent, accidentally, the very pathway now pointed out by science as affording the only gateway to the Pole.

If these were well-ascertained facts, they would be conclusive as to the existence of an open and practicable passage by water to the Pole, and investigation would be limited to finding the route by which these fishermen reached it. So far, however, from being "positive facts," they are all founded upon hearsay of the loosest kind, which, although two centuries have elapsed, has never been confirmed. Capt. Bent frankly states what Mr. Maury seems to have overlooked, that the accounts of these voyages have been treated as fables, but that he, notwithstanding, believes them. It is apparent to my mind that Capt. Bent has never examined the evidence upon which these statements rest, and that he has accepted them because they tend to support his theory, and not from an investigation of the sources from which they

are derived. As so much reliance is placed upon them, I will show upon what they are founded ; including, first, in the inquiry, that upon which Capt. Bent relies, and that we may have a general view of the whole subject, a great many more of which probably he has never heard.

In the latter part of the seventeenth century, there was in London, one Edward Moxon. He was the hydrographer of Charles II., a Fellow of the Royal Society, and the author of several tracts upon geographical and scientific subjects, one of which had some little reputation in its day. About 1655 Moxon was in Amsterdam, and about twenty years afterwards he communicated to the Royal Society what he had heard in Amsterdam of a Dutch fishing vessel that had sailed to the Pole and two degrees beyond it. That the Royal Society attached little or no value to his communication, I infer from the fact that I find no account of it in the Journal of their Transactions, which was then, as it is still, published annually. Disappointed, probably, at their want of appreciation, Moxon, in 1675, published what he had communicated, in the shape of a small tract, now very rare, but the essential particulars of which are preserved in the second volume of Harris's Collection of Voyages. The account is substantially this : That he went into a tavern in Amsterdam, in or about the year 1655, where he found several seamen sitting around the fire. That whilst he was there, another seaman came in who expressed great surprise at seeing one of the seamen by the fire, as it was not yet time for the arrival of the Greenland fleet, and that the other explained his early arrival by stating that he was steersman of a ship that had sailed to the North Pole and back, by the order of the Greenland Company. That he entered into conversation with this seaman, who told him that they had sailed two degrees beyond the Pole ; that they saw neither land nor islands about it ; but that there was a free and open sea, with fine warm weather, such as they had in Amsterdam in summer, and as hot ; that the vessel was then in Amsterdam, and that many of the sailors belonging to her would confirm what he said ; "which," Moxon says, "I believed, as he

appeared to be a plain, honest, unaffected person ;” to which statement Moxon adds another account, which he heard from a Mr. Ben, in London, who told him that he went in a Dutch vessel to Japan, in 1668, and that they sailed from Japan due north, 27 degrees, in a free and open sea, without seeing any land or islands, which we now know to have been an impossibility. If Moxon had felt any interest in a piece of information so important, it would naturally be supposed that he would have sought out the vessel and conversed with the officers, or made further inquiries. It does not appear that he did anything of the kind, but that, after allowing twenty years to go by, he published this loose statement. It may be dismissed, with the observation that, if a vessel had then arrived in Amsterdam bringing intelligence so important, it would have created as much sensation there as would be created at the present day in this city should a vessel arrive bringing like intelligence. There was no subject upon which the mercantile mind of Holland was more intent ; and if an Amsterdam vessel had actually reached the Pole, the fact would have been extensively known, and we should have it now upon the authority of Dutch geographers and historians, instead of resting, as it does, upon what this Fellow of the Royal Society heard in a tavern in Amsterdam.

When this tract of Moxon’s appeared, there was in London an able and experienced seaman, Captain Wood, who believed the statements it contained, the more especially as one Captain Goulding, who had made thirty voyages to Greenland, had told the King that, twenty years before, he had been in company with two Hollanders to the eastward of Edge Island, and that, the whales not appearing, they had gone farther north, and returned in a fortnight, giving out that they had sailed to N. lat. 89°, *one degree from the Pole*, and met no ice, but a free and open sea, “a very hollow *ground* sea like the Bay of Biscay ;” that he (Goulding) was not satisfied with this relation, whereupon they produced to him four journals of the two ships, and that they all agreed within four minutes. Wood was deeply impressed by all these accounts, and had personal influence enough to induce a body

of gentlemen to fit out for him an expedition to reach Japan by the way of the Pole, in command of which he sailed in 1776. Following the route recommended by Barentz, and in which Barentz believed to the day of his death, Wood, when he reached the North Cape, steered N. E., determined to reach the Pole by the very route which Captain Bent thinks is that of the Gulf Stream. He was unable, however, to get further than 76° N. lat. He was constantly running in openings in the ice, and was as constantly compelled to put back ; until at last, after vainly attempting to get to the northward and eastward of Nova Zembla, he was shipwrecked upon that inhospitable land, and returned cured of all belief in a north-east passage or of a passage to the Pole. In his public statement he inveighed against those who, upon alleged information, lead unfortunate mariners to peril their lives in such hopeless attempts, and he makes an observation to which the attention of Captain Bent might well be called, that, " if there were a passage, there would be some current ;" which, he says, " I could never, or very hardly, find, and the little that there was ran E. S. E."

The next statement is to be found in Harris's Collection of Voyages, the editor of which says, that a person, whose name he does not give, told him that there was no difficulty in sailing north about Greenland ; that several Dutch vessels had done it ; that the merchants, being required to verify it, desired that the journals of the Greenland Squadron of 1655 might be produced ; that in several of them notice was taken of a ship which had sailed as high as 89° N. lat., within one degree of the Pole ; that three of the journals of that ship being produced, they all agreed as to an observation taken by the master, Aug. 1, 1655, in $88^{\circ} 56'$ N. lat., and that it was also set forth in their journals that the sea was a hollow rolling sea like that in the Bay of Biscay. We here have the most minute particularity ; not only the observation said to have been taken, but the day set forth upon which it was made ; and although it is now more than a century since the editor of Harris published what this unknown person told him, nothing has ever been found to corroborate it.

The other statement referred to by Capt. Bent is to be found in the Philosophical Transactions of the Royal Society for the month of October, 1675. It is a paper by an anonymous writer, detailing what he declared had been discovered in the matter of a north-east passage. He says that a knot of merchants of Amsterdam had attempted these seas with better success than before, having advanced to the 79° and 80° N.L. That they passed over one hundred leagues above Nova Zembla to the east, which voyage the editor of Harris's Collection fixes, upon information which he says he had received, as occurring in 1679. This statement may be true, for Dutch voyagers and others have sailed north and east of Nova Zembla and found open water. The German Expedition in the present year, in the *Albert*, attained in this direction to $80^{\circ} 14'$ N. lat. and $90^{\circ} 52'$ W. long. The distance reached in this Dutch voyage of 1679 is loosely stated at about *one hundred leagues* of Nova Zembla. Capt. Bent, inadvertently no doubt, converts this one hundred into "several hundred leagues;" a very material difference, which I notice, because he gives great weight to his opinions by speaking of a "*careful* perusal of *all* the narratives of those who have made explorations in these northern seas, and that the history of these explorations was a part of his professional reading for upwards of a quarter of a century; which narratives he cannot have perused very carefully, or he would not have fallen into the error of coupling Barentz's Expedition with that of Willoughby's in the statement that they clung to the coast, which "led them down into the bight between Lapland and Nova Zembla, where their ships were respectively frozen in," nor have set down as a fact that Hudson reached $81^{\circ} 30'$ north latitude, when from Hudson's own accounts of his bearings, and the fact that the northern extremity of Spitzbergen does not lie beyond 81° N. lat., geographers have long been agreed that Hudson must have been mistaken in his latitude, or that he mistook for land extensive fields or masses of ice.

But there is, as I have said, much more testimony of this loose kind not noticed by Capt. Bent. In 1663 Mr. Olden-

burgh, Secretary of the Royal Society, registered certain inquiries answered by a Mr. Grey, who, in one of his replies, said that he had once met in Greenland a Hollander who swore that he had been but half a degree from the Pole, showing him his journal, which was attested by the mate, and that they had seen neither ice nor land; and *Birch*, in his history of the Royal Society, says that he read these inquiries to three very intelligent masters of Greenland ships, and that they confirmed them in every particular. Daines Barrington, in a paper read before the Royal Society in 1774, says that a Mr. Watts told him, a quarter of a century after the event, that when he was 17 years of age, in 1751, he was in a vessel employed in the Greenland fisheries, the captain of which determined to reach the Pole, and that he sailed without the least obstacle to $83\frac{1}{2}^{\circ}$ N. lat., where the sea was still open to the northward; that they did not see a speck of ice after passing the 80° parallel; that the weather was temperate; that he had never experienced a more pleasant navigation, but that when they got to the point stated, the captain desisted from his attempt to reach the Pole, because the mate complained that the compass was not steady, and the captain feared that if any accident should happen he would be blamed for going further, after the mate's protest.

A Dr. Daillie, 50 years after the event, told Campbell, the editor of Harris's Voyages, who narrated it 30 years afterwards, that he, Daillie, when a young man, was on board a Dutch vessel of war, sent out to superintend the Greenland fisheries; that the captain determined to try if he could not reach the North Pole, and penetrated, according to Campbell's recollection, to 88° N. L., where the weather was warm, the sea free from ice and rolling like the Bay of Biscay, but that, as in the former case, the captain would not go any further, for fear that he would be blamed in Holland, and that he would suffer no journal to be made.

In Miller's "Gardener's Dictionary," it is said that a Capt. Johnson, in a voyage to Greenland, regulated his thermometer by the degree of cold which he found at 88° N. L. Buffon, in his Natural History, says that he was assured by a per-

son of credit, that an English captain, named Monson, directed his course to the Pole and came within two degrees of it in an open sea without any ice; and Buffon afterwards gave as his authority a Dr. Hickman, a Fellow of the Royal Society in 1730. A Capt. Wheatley told Barrington that when off the coast of Greenland in 1766 three Dutch captains told him that a vessel of their nation had reached to the 89th parallel, one degree from the Pole. A Mr. Reed also told Barrington that when in the Greenland seas, a Dutch captain, Hans Derrick, informed him that he had been as far as 86° N. lat.; that there were only small pieces of floating ice in the water, and that at the same time there were five other ships in his company, all engaged in this high latitude in catching whales.

Campbell, in his continuation of Harris's Voyages, says: "By the Dutch journals they got into N. lat. $88^{\circ} 56'$ with the sea open. When asked where he got that information, he stated that he had received it from Holland 30 years previously, and that it was an extract from the journals produced to the States General in 1665. If he had an extract from these journals, it is to be supposed that he would have published it; so that his statement simply amounts to what he had heard from Holland 30 years before."

Dr. Hamel, the author of the interesting work on England and Russia, says that the highest point gained was by James Bisbrown, who sailed from Liverpool in 1765 and reached to north latitude $83^{\circ} 40'$, where he found the sea still open. The Doctor does not state, and probably did not know, upon what it was founded. It was told by a seaman, whose name is not given to Capt. Hiatt, a military officer, who communicated it to Barrington in 1776.

One John Adams, a schoolmaster in Essex, England, told Barrington that he was in the Unicorn, Capt. Grey, in 1754, who was then upon his fifty-ninth voyage to the Arctic; that a good observation was taken; that they found the vessel to be in north latitude 83° ; that the captain and Adams went to the mast-head, from whence they saw a sea as free from ice as any part of the Atlantic, and that it was the united

opinion of Adams and the officers of the ship, that they might have reached the North Pole. Why they did not attempt it, is not stated. One Montgomery, a merchant of London, who had been the master of a whaler, also told Barrington that he had followed the whales in the month of June, in 1756, until he reached 83° north latitude by observation.

A Mr. Stevens told Maskelyne the astronomer, in 1773, that he was driven in a Dutch ship, in the month of May, off Spitzbergen into N. lat. $84^{\circ} 30'$, and returned in June; that they saw no land after sailing north of Spitzbergen; that they did not find the cold excessive; that they only used common clothing; met no drift wood, but little ice, and less the further they went to the north.

Those who, like myself, have passed years in the daily occupation of sifting and weighing testimony, know that little or no value whatever is to be attached to evidence of this description. The memory of witnesses after a lapse of time cannot be depended upon in matters of detail, even in affairs in which they have been actors. The literature of maritime discovery abounds with misinformation of this kind, detailed with as much particularity and apparent credibility as this is. Seamen, to whom much of it is to be traced, are proverbially unsafe in respect to what they have seen and known, where exactness or positive facts are essential. Inaccuracy in latitudes, moreover, was the general experience during the principal period covered by these reports, for Hadley's quadrant was not invented until 1731 and the astrolabe previously in use, though reliable enough upon the land, was so affected by the motions of a ship that its accuracy at sea could not be depended upon. But there is something more conclusive than this.

In 1773, an investigation was instituted by Professor Allman, of Leyden, to ascertain how near the Dutch whalers had reached to the Pole. Inquiries were instituted at the Helder, where the greatest number of them live and where their expeditions were fitted out. It was conducted by Capt. May, an officer in the Dutch service, assisted by the eminent Dutch cartographer Van Keulen. Capt. May particularly

applied to those commanders who had made the greatest number of voyages, and "found them," as he says, "men of candor and penetration." Journals were inspected, old maps and charts examined, and every thing sought for in the way of information. The result was, that scarcely a year had passed without some of them getting as far as 81° north latitude, but they rarely found the sea free from ice. That two English ships sailed to the north and returned in ten days, and claimed to have gone as far as 83° N. lat. without any obstruction from ice, and could have gone further, but, finding no whales, had returned. That the most northern voyage ever heard of at the Helder, and one upon which they could with certainty depend, had been made by one John Schol, in 1700, who, according to his reckoning, had reached as far as 84° N. lat.; to which may be added, in conclusion, that they were all asked what course they would take to reach high northern latitudes, and the answer was that they would never seek it to the west of Spitzbergen, but run out to the north from the westward of Nova Zembla; this information, so far, favoring the route advocated by Capt. Bent.

I now come to that part of the theory of Captain Bent which assumes that there is a current running through Behring Straits to the Pole, which I may appropriately preface with the observation of an experienced seaman and Arctic writer, Staff Commander Davis, R. N., that of all the proposed routes to the Pole this is the most speculative and the most hazardous. Captain Bent has not furnished one particle of evidence of the existence of the warm current which he supposes, and Mr. Maury represents, as running north-eastwardly from Behring Straits to the Pole. Progress northward or north-eastward, in this direction, has been found more difficult, dangerous, and more impeded by ice, than in the region east or west of Spitzbergen; in confirmation of which I may refer my hearers to the voyage of Captain McClure, the discoverer of the Northwest Passage, in the *Investigator*, between the years 1850 and 1854.

There is a strong current running through Behring Straits. Kotzebue, in 1815, observed by the course of the drift wood

that it ran along the coast to the N. E. ; that it was more powerful on the Asiatic side, and that its velocity in different parts was from one to three miles an hour. He found the land on the American side, in the Sound which bears his name, *green* as far as the eye could reach ; flowers were in bloom, and no snow could be seen except on the tops of distant mountains, and yet, upon digging but half a foot deep, he found nothing but ice beneath this verdant carpet. He estimated the current on the Asiatic side, when the wind blew from the south, to be three miles an hour. Its course was always N. E. in Behring Straits, and stronger and much colder on the Asiatic than on the American coast ; and he concluded that, as the current in Baffin's Bay runs to the south, the mass of water which flows into these straits takes its course around America and returns through Baffin's Bay to the Atlantic Ocean.

Capt. Bent states that Kotzebue attempted, in 1815, to pass to the west around the Asiatic coast and was barred by ice, and that Kotzebue says "the sea was open to the north-east as far as they could see." There is no such passage as the one quoted by Captain Bent, in Kotzebue's narrative, nor did he attempt to pass to the west around the Asiatic coast. He merely crossed from Cape Krusenstern, on the North American side, to East Cape, on the Asiatic side ; whence he returned south, through Behring Straits, and says nothing about being barred by ice, but only of the current, which carried him in the fog, 50 miles in 24 hours, back upon his course. Kotzebue, in his second attempt in July, 1817, got no farther than the eastern part of St. Lawrence Island, in consequence of the sudden formation of ice, "and my hope," he says, "of penetrating Behring Straits was blasted."

Kotzebue, when exploring the southern part of the great bay or sound, which bear his name, says that he sent a sailor to the mast-head, and he announced that there was still nothing but open sea to the north-east. Captain Bent, I infer, has confounded this observation made in the interior of Kotzebue's Sound, and at the farthest extremity of it to the southward and westward, with the navigator's exploration off Icy Cape

on the Asiatic side, as it is not to be supposed that the Captain would intentionally, in support of his theory, insert, as from Kotzebue's work, a passage not contained in it. There is open water along this part of the North American continent, through which Captain M'Clure found his way to the westward and then to the northward, until the *Investigator* was frozen in and abandoned in Mercy Bay; but whether this is due to the influence of a warm current, flowing from Behring Straits in this direction, or, as Capt. Long supposes, to the action of the rivers which flow into this part of the Arctic, or to the influence of warm south-westerly winds, is in the present imperfect state of our knowledge simply a matter of speculation. That there is a current through the Arctic, from the Pacific to the Atlantic, may be presumed from the fact that the *Resolute*, abandoned by Capt. Kellett in the ice near Cape Cockburn, in Barrow Straits, in May, 1854, was found by an American whaler, in September, 1855, in Davis Straits, near Cape Mercy, having drifted over one thousand miles; and the running of a strong current has been seen, through openings in the ice, by Sir Edward Belcher and others; all of which tends to confirm the supposition of Kotzebue that the current running N. E. through Behring Straits passes out through Davis Straits; but Capt. Bent's supposition of a current running N. E. from Behring Straits, through which an open passage in this direction may be found to the Pole, is a speculation which, so far, has not a single fact that I have been able to discover to support it, and with this observation I quit this branch of the subject, leaving it to my hearers to determine what ground there was for assuring the public that a way to reach the Pole had *at last* been found.

Capt. Kellett, in the *Herald* in 1849, saw land extending with high peaks, N.W. of Behring Straits, which he thought a continuation of the land seen by the natives off Cape Jakan, in Asia, mentioned by Wrangel.

Capt. Bleven, in 1867, in lat. 71° 20' N., long. 175° W., eight miles south of Wrangel's Island to N.W. of Herald Island, saw ranges extending as far as the eye could see.

Capt. Raynor, in 1867, in the *Reindeer*, saw, W.S.W. of Herald Island, land extending, with peaks; he sailed along the south and east sides of it three times, and for a considerable distance. He found its extreme S.W. cape to be $70^{\circ} 50'$ N. lat., $178^{\circ} 15'$ E. long., and its S.E. cape $71^{\circ} 10'$ N. lat., $176^{\circ} 40'$ W. long. The southern coast he found high, with projecting cliffs, and very barren. The coast ran from the S.E. cape N.W. for 15 miles, and then turned to the N.E. There was an island lying E. of it in 170° W. long., and N.W. of Point Barrow, *with a passage between it and the land described.* He found the current here running to the west from one to three knots an hour, and he says, that at long. 170° W. the ice barrier is always 50 to 80 miles farther south than is found to be the case between that longitude and Herald Island, and that there is always a strong current setting to the N.W. between these two points. That currents are changed by the winds in the shoal waters of the Arctic, which he thinks indicates that there is a passage in that direction where the water passes between two barriers of land, that hold the ice; one of which is known, and the other is unknown. The S.W. cape of the island he saw was 25 miles from the Siberian coast.

Capt. Long, in the same year, in August, 1867, which was a favorable one for discovery, saw land whilst in lat. $70^{\circ} 46'$ N., long. $178^{\circ} 30'$ E., and was about 18 miles from the west point of it. The lower part was free from snow, and had a green appearance as if covered with vegetation. He sailed along the east of it, and, near the centre, in long. 180° W., he saw a mountain, that appeared to be volcanic, the approximate height of which was 2,480 feet. The east cape of the land, which he named Cape Hawaii, he found to be in N. lat. $70^{\circ} 40'$, long. $178^{\circ} 51'$ W. He could not say how far it extended, but he saw mountains until they were lost in the distance. He gives it as his opinion that the true way to reach the Pole is to sail from some point between Capes Kekurnai and Schelagskoi, in a course from N. to N.W. until north of Liakov islands, and thence to the North Pole and Spitzbergen. "I have more faith," he adds in conclusion, "that the passage from the Atlantic to the Pacific will be ac-

complished by one of these routes, than I had in the Atlantic telegraph fifteen years ago." We shall probably get some further information respecting this part of the Arctic, east of Behring Straits, from the Russian Expedition under Baron Maydell, to which I before referred, although the expedition was not, I believe, designed to explore the seas to the eastward and northward, but for exploration chiefly upon the land; with instructions, however, to ascertain if land northward was visible from the Siberian coast, as the natives informed Wrangell, and near which it was seen by Capt. Long.

The English Arctic navigators are divided in opinion as to whether it is best to attempt to reach the Pole by going directly north of Spitzbergen, or to make the next attempt by the way of Smith Sound.* Our explorers, Dr. Hayes and Capt. Hall, are in favor of Smith Sound, in which they have the support of that experienced English Arctic navigator, Capt. Sherrard Osborne, who has recently read a very able paper before the Royal Geographical Society, earnestly recommending it; and there is the route, advocated by Capt. Long, east of Behring Straits, by the way of the Liakov islands, to Spitzbergen, which may be attempted by the French Expedition of M. Gustav Lambert, as it is designed for explorations in this quarter of the Arctic. That the Pole will be ultimately reached I entertain no doubt, though, so far as an opinion can be formed from what is known, I doubt if an open passage to it for a vessel, exclusively by water, will be found. The better method, I am inclined to believe, is to go prepared also for sledge boat explorations upon the land when the farthest point by water has been reached, especially if the attempt is made by the way of Smith Sound, or north of Spitzbergen.

It had been my intention to give the reasons why, in a geo-

* Admirals Back, Collinson, Wrangell, Sir Lionel McClintock, Staff Commander Davis, and Captains Osborne and Hamilton are in favor of Smith Sound, whilst Admirals Belcher, Ommaney, and Fitzroy, General Sabine, President of the Royal Society, and Captains Richards, Inglefield, and Young are for the route north of Spitzbergen.

graphical and scientific point of view, the discovery of the Pole was of great importance ; but my limits forbid.* There is now throughout Europe the greatest activity prevailing, and the deepest interest felt, in the attainment of this object, which will never cease until the end is accomplished. Our country has as deep an interest in it as any other, and yet our own Government has done comparatively nothing. It is to be hoped that Congress will be awakened to a sense of what is due on the part of a nation so energetic and enterprising as ours. To do anything effectually, it must be done by our Government ; and in this emulous strife of nations it would be a proud distinction for us, and a noble vindication of a marked feature in our national character, should the flag which bears as its emblem the stars that guide the mariner, be the first to wave over this pivot of the globe.

* They will be found elaborately set forth by M. Gustave Lambert in the *Bulletin de la Société de Géographie, Paris, December, 1867.*